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EXAMINER

NORTON, NADINE GEORGIANNA

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 07/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/807,841

Applicant(s)

LUND ET AL.

Examiner

Nadine Norton

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 29 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13 and 22-24 is/are allowed.
- 6) ☒ Claim(s) 1-12 and 14-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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## DETAILED ACTION

### *Specification*

This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 7, and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 3 and 19, applicants' refer to the addition of "desired chemicals". It is unclear which specific chemicals belong to the group of desired chemicals.

In claim 7, applicants use the phrase "sufficiently low". The term "low" is a relative term which renders the claim indefinite because it is unclear what specific temperatures are encompassed by "low".

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2, 4-12, 14, and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heinemann et al.(6,180,843) in view of Gudmundsson (5,536,893).

Applicants are claiming a method and apparatus for transporting a flow of hydrocarbons wherein the hydrocarbons are cooled and introduced into the reactor where it is mixed with gas hydrates in order to convert the water therein to gas hydrates. Applicants further claim the hydrates are separated into a first flow and second flow containing hydrates. The first flow containing hydrates is recycled to the reactor.

The reference of Heinemann et al.(6,180,843) discloses an apparatus and process for producing gas hydrates including a reactor. See abstract, line 1. Suitable feeds include a hydrate forming gas. See column 4, lines 40-45. The reactor can include an initial indirect heat exchanger. The reference also illustrates that it is known in the prior art to cool a feed prior to entering the hydrate reactor. See figure 1, heat exchanger (104) and (108). Heinemann et al.(6,180,843) teaches that water should be finely divided before it enters the reactor (for example by a distributor). See column 6, lines 40-45. Suitable water sources include salt water and sea water.

The reference of Heinemann et al.(6,180,843) succeeds at disclosing a process and system with steps and apparatus corresponding to applicants' reactor and pipeline (since products have to exit the reactor – a pipeline is encompassed).

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Several differences are noted between the reference of Heinemann et al.(6,180,843) and applicants' invention. The reference is silent about a step and apparatus for separating and recycling hydrate products to the reactor. The reference is silent about mixing prior to reactor entry.

The reference of Gudmundsson (5,536,893) is cited to illustrate that hydrate formation in a reactor can be "increased" by adding seeds of hydrate crystals to feed to the reactor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process and apparatus of Heinemann et al.(6,180,843) to include the separation and recycle of a portion of the hydrate product back to the reactor because the reference of Gudmundsson (5,536,893) illustrates that adding seeds of hydrate crystals to a feed desirably increases the formation of hydrates.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a mixer prior to feed entry in the process of Heinemann et al.(6,180,843) because Heinemann et al.(6,180,843) teaches that water must be finely divided in the feed before entering the reactor. Mixing is a conventional method of finely dividing water.

### ***Claim Rejections - 35 USC § 103***

Claims 3 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heinemann et al.(6,180,843) in view of Gudmundsson (5,536,893) as applied to claims.... above, and further in view of Rojey et al.(5,816,280).

It is noted that the modified teachings of Heinemann et al.(6,180,843) are silent about adding a chemical to the feed or apparatus.

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The reference of Rojey et al.(5,816,280) is cited to illustrate that additives which are capable of modifying the hydrate forming mechanism in order to form hydrates which are dispersed in fluid without agglomerating or clogging pipes.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a chemical in the form of an additive for affecting the mechanism of hydrate formation to the modified process of Heinemann et al.(6,180,843) because the reference of Rojey et al.(5,816,280) illustrates that it is known to employ an additive for modifying the mechanism of forming hydrates. Such additives desirably allow the formation of hydrates without unwanted agglomeration and clogging of pipes.

***Allowable Subject Matter***

Claims 13 and 22-24 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose or suggest an apparatus for forming hydrates which is coated with a water repellant.

***Prior Art of Record***

The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The attached references are cited to illustrate the relative state of the art with respect to the production and transport of hydrates.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nadine Norton whose telephone number is 703-305-2667. The examiner can normally be reached on Monday through Thursday from 7:30 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0661.

N.N.

June 30, 2003

**NADINE G. NORTON**  
**PRIMARY EXAMINER**

